Claims

1. An injection nozzle for an internal combustion engine, in particular in a motor vehicle,

-having a nozzle body (2) equipped with at least one first injection opening (5) and at least one second injection opening (6),

-having a first nozzle needle (8), which is embodied in the form of a hollow needle, is guided in a first needle guide (7) of the nozzle body (2), and is able to control the injection of fuel through the at least one first injection opening (5), and

-having a second nozzle needle (15), which is situated coaxial to the first nozzle needle (8) and is able to control the injection of fuel through the at least one second injection opening (6),

characterized in that

-a control piston (38) is provided that is drive-coupled to an actuator (57),

-a first drive piston (18) is provided, which is drive-connected to the first nozzle needle (8) and is equipped with a first booster surface (20) that a first hydraulic pressure transmission path (44) hydraulically couples to a control surface (40; 79) of the control piston (38),

-a second drive piston (28) is provided, which is drive-coupled to the second nozzle needle (15) and is equipped with a second booster surface (30) that an activatable and deactivatable second hydraulic pressure transmission path (47) is able to hydraulically couple to a control surface (43; 79) of the control piston (38), and

-the activation and deactivation of the second hydraulic pressure transmission path (47) are controlled as a function of the control piston stroke.

2. The injection nozzle according to claim 1,

characterized in that a control piston stroke at which the second hydraulic pressure transmission path (47) switches between its activated and deactivated state is predetermined so that with an opening stroke motion of the control piston (38) up until it reaches this predetermined control piston stroke, the first nozzle needle (8) executes an opening stroke while the second nozzle needle (15) remains in its closed position and with an opening stroke motion of the control piston (38) that travels beyond this predetermined control piston stroke, the second nozzle needle (15) also executes an opening stroke.

3. The injection nozzle according to claim 1 or 2,

characterized in that

-at a first end (41), the control piston (38) has a first control surface (40) situated in a first control chamber (35) and at a second end (42) oriented away from the first end (41), the control piston (38) has a second control surface (43) situated in a second control chamber (37),

-the first hydraulic pressure transmission path (44) couples the first control surface (40) to the first booster surface (20), and

-the second hydraulic pressure transmission path (47) is able to couple the second control surface (42) to the second booster surface (30).

4. The injection nozzle according to claim 3,

characterized in that

-a controllable hydraulic connection (48) is able to connect the second control chamber (37) to a supply line (11) that supplies highly pressurized fuel to the injection openings (5, 6),

-the hydraulic connection (48) is controlled to open and close as a function of the control piston stroke position,

-the second hydraulic pressure transmission path (47) is deactivated when the hydraulic connection (48) is open and is activated when the hydraulic connection (48) is closed.

5. The injection nozzle according to claim 3 or 4,

characterized in that

-the first booster surface (20) is situated in a first booster chamber (21) that communicates with the first control chamber (35) via a first control conduit (34),

-the second booster surface (30) is situated in a second booster chamber (31) that communicates with the second control chamber (37) via a second control conduit (36).

6. The injection nozzle according to claim 3 or 4,

characterized in that the first booster surface (20) is situated in the first control chamber (35).

7. The injection nozzle according to claim 3, 4 or 6,

characterized in that

-the second hydraulic pressure transmission path (47) contains a coupling piston (67) that has a first coupling surface (69), which is contained in the second control chamber (37) and is situated at a first end (68), and has a second coupling surface (71), which is contained in a

booster chamber (31) and is situated at a second end (70) opposite from the first end (68), and

-the second booster surface (30) is situated in the booster chamber (31).

8. The injection nozzle according to claim 7,

characterized in that

-the coupling piston (67) is supported coaxially in the first drive piston (18) and is able to execute a stroke motion therein and/or

-the coupling piston (67) is supported coaxially on the second drive piston (28) and is able to execute a stroke motion thereon.

9. The injection nozzle according to claim 4,

characterized in that a segment (49) of the hydraulic connection (48) is contained in the control piston (38).

10. The injection nozzle according to claim 1 or 2,

characterized in that

-the control piston (38) has a control surface (79) situated in a control chamber (78),

-the first hydraulic pressure transmission path (44) couples the control surface (79) to the first booster surface (20), and

-the second hydraulic pressure transmission path (47) is able to couple the control surface (79) to the second booster surface (30).

11. The injection nozzle according to claim 10,

characterized in that

-the second hydraulic pressure transmission path (47) has a controllable hydraulic connection (81) that is able to connect a first booster chamber (21), which contains the first booster surface (20), to a second booster chamber (31), which contains the second booster surface (30),

-the hydraulic connection (81) is controlled to open and close as a function of the control piston position, and

-the second hydraulic pressure transmission path (47) is activated when the hydraulic connection (81) is open and is deactivated when the hydraulic connection (81) is closed.

12. The injection nozzle according to claim 11,

characterized in that a segment (82) of the hydraulic connection (81) is contained in the first drive piston (18).

13. The injection nozzle according to one of claims 3 through 12,

characterized in that the second drive piston (28) has a compensator surface (60), which is oriented away from the second booster surface (30) and situated in a compensator to chamber (61) that communicates with the supply line (11).

14. The injection nozzle according to one of claims 3 through 13,

characterized in that the first drive piston (18) has a compensator surface (22), which is oriented away from the first booster surface (20) and situated in a compensator chamber (23) that communicates with the supply line (11).